AF/1745

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#17
P-10-02

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

In re application of: Takeuchi et al.

Serial No. 09/176,374

Filed: October 21, 1998

For: Wound Element Electrode Assembly Design
For Use in Prismatic Case Electrochemical Cells

Group: 1745

Examiner: T. Dove

APPELLANTS' REPLY BRIEF

Assistant Commissioner for Patents
Washington, D.C. 20231

Sir:

In accordance with the provisions of 37 C.F.R. 1.193 appellants submit the following Reply brief:

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TABLE OF AUTHORITIES

Cases:

Patents

I. Reasons Supporting The Grouping Of Claims

In the Answer, the Examiner requests reasons supporting the grouping of claims presented in the appellate brief. There are a plurality reasons for the groupings presented. First, claims 1-10 (2-10 dependent on claim 1) are drawn to the methodology of making an electrode assembly (method claims), whereas claims 13-19 (14-19 dependent on claim 13) are all drawn to a high rate cell.

Also, the facts section of the appellate brief support the grouping of the claims presented by appellant. In particular, the cell is first described on pages 4-6 of the appellate brief. Then, the method of winding is described on pages 6-7. Similarly, for the second embodiment, the cell is described first on page 7 of the appellate brief, and then the method for winding the cell of the second embodiment is described on pages 8-9.

Additionally, in the argument in the reply brief, twice amended claim 1 for the method of winding is discussed on pages 14-16, while amended claim 13 for the cell itself is discussed separately on page 17.

Therefore, all of these factors show direct support for the grouping of the claims presented in the appellate brief.

Reply Argument

II. A Question Of Obviousness

The U.S. Supreme Court has held that for purposes of assessing the obviousness of a claimed invention, one must consider the scope and content of the prior art and the

differences in the prior art and the claimed invention. Here, the Machida reference shows electrodes wound about a two piece spool, because winding avoids bending the electrodes at ninety degree angles. It teaches bending of the electrodes can damage them, causing short circuits when the electrodes are used in an electrode assembly. The Takeuchi reference shows a rectangular mandrel, but it does not teach folding a longer electrode on itself to form a protective pocket about the mandrel. The claimed invention is an electrode assembly comprising a longer electrode and a shorter electrode. The longer electrode is folded on itself about a rectangular mandrel, and then both electrodes are folded about the mandrel. The longer electrode thus forms a protective pocket about the mandrel, so that upon mandrel removal only the longer electrode can potentially be damaged. This claimed arrangement is not taught, suggested, or shown in the prior art. Should the claim(s) be rejected as being obvious in view of the cited references?

III. The Machida Reference Is Misinterpreted In The Answer

The prior art cited to deny patentablilty of the claimed invention does not make the claimed invention obvious, as the cited references have been misconstrued in the Answer. In particular, the Answer reads on page 3, last sentence and continuing on page 4 lines 1-3:

"Specifically, Machida does teach and suggest a longer electrode folded upon itself. This feature is taught by Machida in col. 5, line 61-col.6, line 10 and shown in Fig. 6. Fig. 6 clearly shows and suggests that the positive electrode is longer than the negative electrode and the positive electrode is folded upon itself."

The Answer incorrectly uses the word *fold* to describe the

Machida et al. reference, U.S. Patent No. 4,709,472 (hereafter "Machida"), because Machida and figure 6 of Machida show the electrodes being *wound*. The importance of this point cannot be over-stressed.

The Answer is incorrect when it states that figure 6 of Machida shows the electrodes *folded* upon themselves. A fold implies that there is a angular bend or perhaps a ninety-degree bend in the electrodes. However, reference to Fig. 6, and col 5 lines 61-61 and col. 6 lines 1-4, of the Machida patent clearly state and teach that the electrodes are *wound* about the circular mandrel shown in that patent.

The Answer discusses the folding of the electrodes in Machida, when in fact the electrodes in that reference are never folded. The electrodes in Machida are all wound. Machida describes the necessity of winding electrodes in order to overcome the problems in the prior art associated with bending/folding electrodes, which can result in short circuits at the point of the bend (See Machida col. 2, lines 61-65). The electrodes in Machida are not folded.

Machida uses a two piece spool with separator material therebetween and then winds the electrodes to overcome problems associated with in the prior art. The prior art discussed in Machida placed the electrode between the spool halves, and when winding occurred, the electrode was forced into a bend where it emerged from between the spool halves. This bending damaged the electrode. (Machida col. 1 lines 27-33 and col. 2 lines 61-65). In fact, the Machida reference is actually directed to completely avoiding bending an electrode at a ninety-degree angle, as discussed in that patent at col. 5., lines 63-68, col. 6 line 1, which states:

"a portion consisting of separator only is wound in a first step of the winding operation, thereby eliminating winding of a portion of one of the electrode members at an angle of about 90

degrees resulting frequently in an objectionable short-circuit trouble attributable to collapse of that portion of the electrode member."

The Machida reference itself, the primary reference to cited and employed to defeat patentablilty, discloses and warns that electrodes ought not be bent at ninety-degree angles because the bending can result in short circuit problems. This portion of the prior art cannot be ignored. Therefore, it is incomprehensible how this reference was utilized as the primary reference to defeat patentability, when it specifically teaches away from the rectangular mandrel utilized in the claimed invention, and the right angle bends the claimed electrodes are subjected to as the are folded about the rectangular mandrel called for in twice amended claim 1.

Nevertheless, the Answer asserts that placing the rectangular mandrel shown in U.S. Pat. No. 5,549,717 to Takeuchi et al.(hereinafter Takeuchi), in the electrode assembly of Machida, is something that one skilled in the art would have done, even though Machida uses a two piece spool mandrel to avoid angular bends in electrodes. Combinability of Machida and Takeuchi is therefore completely contrary to the teachings of the primary Machida reference itself. This responds to the repeated assertion in the Answer that combinability has not be argued.

In other words, the Machida reference specifically teaches that winding/bending an electrode at a ninety-degree angle is undesirable, troublesome, and a problem associated with and found in the prior art, because a the electrode could be damaged at the ninety-degree bends and this could lead to short circuits in the assembly. Also, that patent *only* teaches and shows that a spiral electrode assembly can be formed from the electrodes, and subsequently placed in a cylindrical cell casing, again avoiding bending the electrodes at ninety-degree angles (col. 5, lines 45-51). It never discusses rectangular mandrels. Hence, the

Machida reference teaches that electrodes should not be bent at ninety-degree angles because damage occurs to the electrode.

Incredibly, this teaching is used as the primary reference to establish obviousness. This is a paradox. How can the primary reference, when it teaches a two piece round mandrel to specifically and explicitly avoid bending the electrodes at ninety degree angles to prevent damage thereto, be used to defeat patentablity, when the claimed invention specifically calls for a rectangular cross sectioned mandrel (see twice amended claim 1) which results in the electrodes being bent at a substantially ninety-degree angle four times for every revolution about the mandrel?

With this in mind, in paper number 10, page 4, the Examiner writes that:

"Machida et al. does not explicitly teach a mandrel of rectangular cross-section having a pair of parallel and planar oppositely-facing surfaces."

And continues:

"Takeuchi teaches shaping the anode-cathode subassembly so that the assembly has a rectangular cross section."

And continues:

"one way of achieving this shape is by using a mandrel of substantially rectangular configuration."

And continues:

"Therefore the invention as a whole would have been obvious to one of ordinary skill in the art . . . because one of skill would have known that the anode-cathode subassembly could be shaped to have a rectangular cross section after being formed on a mandrel on non-rectangular cross section."

How? There is no link, not even a hint of a link, between Machida and Takeuchi that could possibly allow one skilled in the art to make such a connection and draw such a conclusion. Indeed, after reading Machida, one skilled in the art could

reasonably be discouraged from ever using a mandrel having corners.

The Examiner's ultimate conclusion that:

> one of skill would be motivated to use the mandrel of rectangular cross section of Takeuchi for the mandrel of Machida because Takeuchi teaches that if a rectangular shape is desired a mandrel of rectangular cross section may be used or a circular subassembly may be pressed to obtain the desired rectangular shape . . . depending on the desired shape of the container, one of skill would be motivated to alter the shape of Machida.

(paper number 10, page 5) is quite problem-some.

How can a rectangular mandrel can be substituted for the two semi-circular mandrel halves used in Machida, when the Machida reference specifically teaches the undesirability of bending an electrode at a ninety-degree angle, as this would cause damage to the electrode? Somehow it is concluded that one skilled in the art would be motivated to alter Machida into a rectangular shape when Machida specifically and unequivocally teaches against ninety-degree bending of the electrodes. To reach such a conclusion is unjustified, as there is no suggestion, teaching, showing, or support in the references to do this. Indeed, the prior art is devoid of motivation make such a combination.

The combination of Machida and Takeuchi is simply nowhere suggested in the prior art, as these references show the classical scenario of references teaching away from the claimed invention. In particular, Machida proclaims that ninety-degree bends in electrodes are undesirable and from this it may be reasonably concluded that a rectangular mandrel with four ninety-degree corners is similarly undesirable, and Takeuchi shows electrodes being bent at ninety-degree angles at each of the four corners of the mandrel.

IV. The Rational For Combinability is Flawed

The rational for combinability proffered to deny patentability is flawed. In particular, the statements on pages 7 and 8 of the Answer are quite problematic. On page 7, it is written:

"Takeuchi discloses both rectangular and circular mandrels, hence, the prior art combination has a clear suggestion to use the rectangular mandrel in place of the circular mandrel of Machida".

And on page 8 of the Answer it is written:

"It is the position of the Examiner that the rectangular mandrel of Takeuchi could be used for the circular mandrel of Machida." (emphasis in original)

It is impermissible to hunt and pick from the prior art to create the claimed invention. If that were the law, nothing could be patented, because every new invention can be broken down into old parts. Similarly, just because the prior art can be modified into the claimed invention does not mean the claimed invention is obvious.

Indeed:

"The mere fact that the prior art could so be modified would not have made modification obvious unless the prior art would have suggested the desirability of the modification." In re Laskowski 871 F.2d 115, 117, 10 U.S.P.Q.2d 1397, 1398 (Fed. Cir. 1989); citing In re Gordon, 773 F.2d 900, 902, 221 U.S.P.Q. 1125, 1127 (Fed. Cir. 1984).

There must therefore be some showing in the prior art that can be pointed to suggesting the desirability of the modification. The Examiner somehow makes the jump from the Machida reference that teaches against bending electrodes at ninety degree angles, and only teaches round mandrels, to ultimately inserting the rectangular mandrel of Takeuchi directly into the wound electrode assembly of Machida. The problem is

that nowhere does either Machida or Takeuchi suggest this, and nowhere does Machida describe the desirability of bending electrodes at ninety degree angles as it specifically teaches against this exact manipulation of electrodes. Therefore, any rejections premised on obviousness using the combination of these references cannot stand.

V. The Answer's Reliance on the Keller Case is Misplaced

The Answer immediately commences with a generic quote from the case entitled In Re Keller, 642 F.2d 413, 208 U.S.P.Q. 871 (CCPA 1981). Indeed, the Answer cites to this case at least four times for the general proposition that "one cannot show nonobviousness by attacking references individually where the rejections are based on a combination of references." In re Keller, at 426. Regardless of how many times this quoted portion of the Keller case is asserted in the Answer, the Answer does not appear to apply the correct standards for determining nonobviousness.

In particular, 37 C.F.R. Section 1.192(c)8(iv) requires that the appellate brief contain a discussion of the differences in the claimed invention and the prior art and in particular "the specific limitations in the rejected claims which are not described in the prior art relied on in the rejection". The appellate brief, starting at page 13 discusses the differences in the claim features and the prior art, in this case Machida and Takeuchi. The Answer implies that it is incorrect/wrong to consider the differences between the prior art and claimed invention because "one cannot show nonobviousness by attacking references individually where the rejections are based on a combination of references." In re Keller, at 426. This generic quoted language selected from the Keller case in no way relieves the Examiner from the crucial task of considering and studying

the differences in the claim features and the prior art as mandated in the Code of Federal Regulations. Id. Therefore, when the Answer immediately commences by citing the Keller case for above quoted generic proposition, this material is taken completely out of context. Appellants, instead of "attacking" the cited references, undertook the requisite careful study of the differences in the prior art and the claimed invention.

The importance of determining the differences cannot be overstated, as this is crucial in a nonobviousness analysis. In Graham v. Deere, the United States Supreme Court held that in conducting an obviousness analysis, the scope and content of the prior art is to be determined, the differences between the prior art and the claimed subject matter is to be determined, and the level of skill in the art is to be determined. Graham v. John Deere Co., 383 U.S. 1, 17-18; 86 S.Ct. 684 (1966).

Unfortunately, the Answer presents no such an analysis pertaining to the differences in the prior art, but rather reiterates again and again the phrase "one cannot show nonobviousness by attacking references individually where the rejections are based on a combination of references." In re Keller at 426. If the differences in the Machida and Takeuchi references and the claimed invention are considered, the nonobviousness of the protective folded electrode pocket of the claimed invention is readily evident.

VI. The Facts Weigh Heavily Against a Finding of Obviousness

The following facts weigh heavily against a finding of obviousness:

a. *Nowhere* in the primary reference (Machida) is a rectangular mandrel taught. The only mandrels disclosed in that patent are for spools and two piece semicircular spools. Twice amended independent claim 1 of the present invention specifically calls for "said mandrel being of substantially rectangular cross

section."

b. Twice amended claim 1 specifically calls for a first step of folding the longer electrode on itself about the mandrel. The Machida reference *nowhere* calls for a first step of folding a longer electrode on itself. In Machida, the electrodes are of substantially the same length as seen in figures 5-7 of that patent. Further, the Machida reference specifically teaches the electrodes are not to be bent at ninety-degree angles, or in other words, folded as that damages the electrode.

c. Takeuchi *nowhere* teaches folding a longer electrode to form a protective pocket as called for in twice amended claim 1. Amended claim 1 calls for folding the long electrode on itself about the mandrel so that the separator material on the longer electrode contacts both of the oppositely facing surfaces of the mandrel, and this thus forms a protective pocket around the mandrel and avoids potential short circuits.

d. Amended independent amended claim 11 is not obvious as it calls for one of the electrodes to be folded upon itself, and at the innermost portion of the assembly a rectangular pocket is defined with only separator material therein. The Machida reference *nowhere* shows any rectangular pocket but rather discusses the undesirability of folding/bending electrodes, and Takeuchi *nowhere* shows an electrode folded upon itself, as called for in amended claim 11.

e. Amended independent claim 12 is not obvious as it calls for one of the electrodes to be longer in length and folded upon itself at the innermost portion so that two substantially flat sections of the longer electrode face one another with only separator therebetween. *Nowhere* does Machida teach folding of electrodes, and *nowhere* does Takeuchi teach this arrangement of an electrode folded in upon itself. Thus, amended independent claim 12 is nonobvious as it claims subject matter that is simply

not shown or taught in either of the cited references.

f. Amended independent claim 13 calls for an assembly wherein at the innermost portion one of the electrodes is folded upon itself to define a substantially rectangular shaped pocket with only separator material therein. Again, the Machida reference does not teach this, and the Takeuchi reference does not teach this.

The summation of a-f supra, reveals several important points. First, Machida nowhere teaches the use of a rectangular mandrel, it is *silent* on this point. Machida also nowhere teaches folding an electrode to form a protective pocket, nor does it suggest that it is feasible or desirability to bend an electrode. Takeuchi nowhere suggests folding an electrode in a unique configuration such that a protective pocket is made from a single electrode folded in upon itself. It is *silent* on this point.

Thus, the claimed invention is the first time a longer electrode was ever folded in upon itself about a rectangular mandrel to form a protective pocket. The inventors of the present invention embarked on a path contrary to conventional wisdom. They dramatically created a new and nonobvious way to fold electrodes about a rectangular mandrel so that a protective pocket is formed about a rectangular mandrel, greatly reducing the probability of a short circuit during electrode folding and mandrel removal.

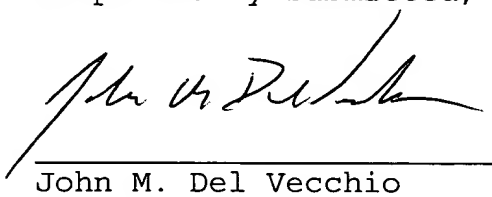
VII. Conclusion

Hence, the claimed invention is nonobvious as it calls for folding electrodes about a rectangular mandrel in such a way that a protective pocket is formed about the mandrel. This is nowhere taught in the prior art. Indeed, there is not even suggestion or motivation to combine the cited references as has been done by

the Examiner in order to deny the patentability of appellants' invention.

Appellants respectfully request favorable action on this Appeal, and that the claims 1-19 set forth herein be allowed.

Respectfully submitted,



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